CLAIMS

1. A machine (20) for the working of sheet metal parts (1, 2), in particular a flanging machine for bending a folded edge (3a) of a first sheet metal panel (1) against an edge portion (4) of a second sheet metal panel (2); the machine comprising

a tool-carrying unit (10; 11, 12);

a supporting structure (24, 26);

a movable unit (28) mounted on the supporting structure (24, 26) and carrying the tool-carrying unit (10; 11, 12), the movable unit (28) being capable of translating along a first direction (Z), or working direction, and of being moved in a second direction (X) towards and away from the part to be worked (1, 2); and

a first driving system for controlling the movement of the movable unit (28) in the first direction (Z), said first system including a first motor unit (60) for controlling the rotation of a driving shaft (62) and a mechanism for converting the rotational movement of the shaft (62) into the translational movement of the movable unit (28);

the machine being characterized in that the motion conversion mechanism comprises a cam member (76), the rotation of which is controlled by the driving shaft (62), and a first engagement surface (78) arranged to co-operate with an outline (76a) of the cam member (76), the cam member (76) being mounted on the movable unit (28) or on the supporting structure (24, 26) and the first engagement surface (78) being provided by the supporting structure (24, 26) or by the movable unit (28), respectively, in such a manner that the movement of the movable unit (28) along the first direction (Z) is controlled by the rotation of the cam member (76).

2. A machine according to Claim 1, wherein the said first engagement surface is a cylindrical surface provided by a first roller member (78) rotatably mounted on the supporting structure (24, 26) or on the movable unit (28).

3. A machine according to Claim 1 or Claim 2, wherein the cam member (76) and the first roller member (78) are rotatably mounted about respective axes of rotation substantially aligned along the first direction (Z).

4. A machine according to any of the preceding claims, wherein the movable unit (28) can translate in a first, mainly vertical direction (Z) and in a second direction (X) substantially perpendicular to the first.

5. A machine according to Claim 4, wherein the cam member (76) is supported for rotation by the movable unit (28) and the movable unit (28) rests with the cam member (76) on the first engagement surface (78).

6. A machine according to Claim 4, further comprising a stationary base (22) on which the supporting structure (24, 26) is mounted in such a manner that it can translate in the second direction (X).

7. A machine according to Claim 6, wherein the supporting structure (24, 26) comprises a movable base (24) supported by the stationary base (22) and a main body (26) attached to the movable base (24) and on which the movable unit (28) is mounted in such a manner that it can translate in the first direction (Z).

8. A machine according to Claim 6 or Claim 7, further com-

prising a second driving system for controlling the movement of the movable unit (28) in the second direction (X), said second driving system including a second motor unit (34) and a crank mechanism (36) for converting the rotational movement provided as output by the second motor unit (34) into the translational movement of the movable unit (28).

9. A machine according to Claim 1 or Claim 8, wherein said first and/or second motor unit (34, 60) are electrical geared motor units.

10. A machine according to Claim 4, wherein the first motor unit (60) is mounted on the movable unit (28) on the opposite side to the part to be worked (1, 2), the driving shaft (62) extends through the movable unit (28) parallel to the said second direction (X), and the cam member (76) is mounted on an end portion (70) of the driving shaft (62) facing the part (1, 2) to be worked.

11. A machine according to Claim 5, wherein the cam member (76) is arranged to co-operate also with a second engagement surface (86) located on the opposite side of the cam member (76) to the first engagement surface (78) so as to control the movement of the movable unit (28) in the first direction (Z) with a higher force than the weight-force of the movable unit.

12. A machine according to Claim 11, wherein the said second engagement surface is a cylindrical surface provided by a second roller member (86) rotatably mounted about a stationary axis of rotation on the opposite side of the cam member (76) to the first roller member (78).

13. A machine according to Claim 11, wherein the cam member (76), the first roller member (78) and the second roller member (86) are rotatably mounted about respective axes of rotation substantially aligned along the first direction (Z).

14. A machine according to Claim 11, further comprising an annular member (72) eccentrically mounted on the driving shaft (62) and arranged to co-operate, when the cam member (76) disengages from the first engagement surface (78), with a third engagement surface (90) located on the same side of the cam member (76) as the second engagement surface (86) in order to control the movement of the movable unit (28) in the first direction (Z) with a higher force than the weight-force of the movable unit.

15. A machine according to any of the preceding claims, for connecting the first and second sheet metal panel (1, 2) by means of a flanging operation, wherein the tool-carrying unit (10; 11, 12) carries a first pre-flanging tool (11) and a second final-flanging tool (12) in such a manner that the flanging operation is performed in a first phase and in a second phase, in which the edge (3a) of the first panel (1) is bent to a pre-flanging position and to a final-flanging position, respectively.

16. A machine according to Claim 15, wherein the pre-flanging tool (11) and the final-flanging tool (12) have respective working surfaces (11a) inclined substantially at 45 degrees and 90 degrees, respectively, to the first direction (Z).

17. A machine according to Claim 15, when dependent on Claim 14, wherein the eccentric annular member (72) is arranged to

co-operate with the third engagement surface (90) to control the movement of the movable unit (28) in the first direction (Z) when either of the said pre-flanging phase and final-flanging phase is performed.

18. A machine according to Claim 17, wherein the cam member (76) is arranged to co-operate with the second engagement surface (86) during the pre-flanging phase and the eccentric annular member (72) is arranged to co-operate with the third engagement surface (90) during the final-flanging phase.

19. A machine according to Claim 18, wherein the eccentric annular member (72) and the third engagement surface (90) are substantially aligned with the bent edge (3a) along the first direction (Z) during the final-flanging phase.

20. A driving system for controlling the translational movement along a working direction (Z) of a movable unit (28) mounted on a supporting structure (24, 26) of a machine (20) for the working of sheet metal parts, in particular of a flanging machine, the driving system including a motor unit (60) for controlling the rotation of a driving shaft (62) and a mechanism for converting the rotational movement of the shaft (62) into the translational movement of the movable unit (28);
characterized in that the motion conversion mechanism comprises a cam member (76), the rotation of which is controlled by the driving shaft (62), and an engagement surface (78) arranged to co-operate with an outline (76a) of the cam member (76), the cam member (76) being mounted on the movable unit (28) or on the supporting structure (24, 26) of the machine and the said first engagement surface (78) being provided by the supporting structure (24, 26) or by the movable unit

(28), respectively, in such a manner that the movement of the movable unit (28) along the first direction (Z) is controlled by the rotation of the cam member (76).